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**KITAO MASUAKI****(54) NEAR INFRARED ABSORPTIVE LAMINATE****(57) Abstract:**

**PROBLEM TO BE SOLVED:** To provide a near infrared adsorptive laminate which displays superior weatherability under an inhibitive effect upon the deterioration of a near infrared absorptive pigment.

**SOLUTION:** This near infrared absorptive laminate is of such a structure that a transparent plastic film base material is formed on both sides of a layer containing

the near infrared absorptive pigment having a maximum absorptive wavelength in the range of 780 to 1,200 nm. The transparent base material is a material with a moisture permeability of 1,000 g/m<sup>2</sup>.24 hrs or less. The near infrared absorptive laminate shows a near infrared absorbing power residual rate of 70% or higher after 192 hours of a continuous irradiation test by an accelerated weatherability test using an ultraviolet autofadeometer.

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CLAIMS

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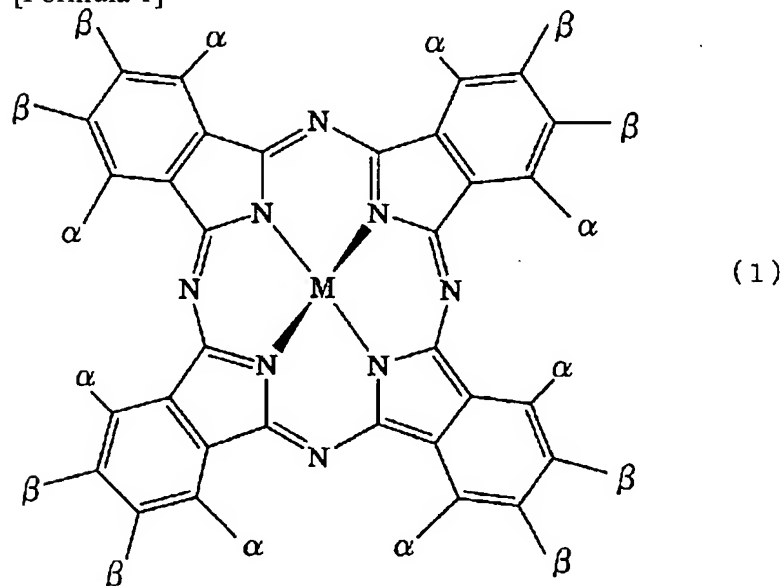
## [Claim(s)]

[Claim 1] It is the near infrared ray absorptivity layered product which has a transparence plastic film base material on both sides of a near infrared ray absorptivity coloring matter content layer which have absorption maximum wavelength in 780nm - 1200nm and which is structure. This transparence plastic film base material is the quality of the material from which moisture vapor transmission serves as 2-24h or less of 1000 g/m. This near infrared ray absorptivity layered product The near infrared ray absorptivity layered product to which the near infrared ray absorbing-power survival rate 192 hours [ by the accelerated weathering test in ultraviolet-rays auto fade meter ] after a continuous irradiation trial is characterized by being 70% or more.

[Claim 2] The near infrared ray absorptivity layered product according to claim 1 to which said near infrared ray absorptivity coloring matter content layer is characterized by containing one or more sorts in acrylic resin, acrylic silicone system resin, fluororesin, polyester system resin, and urethane system resin.

[Claim 3] Said near infrared ray absorptivity coloring matter is the following general formula (1).;

## [Formula 1]



the inside of a formula and alpha are the same -- or it differs, SR1, OR2, NHR3, or a halogen atom is expressed, and NHR3 is made indispensable. R1 and R2 And R3 The aralkyl radical of the same, or the phenyl group which may differ and may have a substituent, the alkyl group of carbon numbers 1-20 or carbon numbers 7-20 is expressed. beta is the same -- or -- differing -- SR1 and OR2 or a halogen atom - - expressing -- SR1 Or OR2 Suppose that it is indispensable. However, at least one of alpha and beta is a halogen atom or OR2. Suppose that it is indispensable. M expresses a non-metal, a metal, a metallic

oxide, or a metal halogenide. Near infrared ray absorptivity layered product according to claim 1 or 2 characterized by being the compound expressed.

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DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to a near infrared ray absorptivity layered product.

[0002]

[Description of the Prior Art] A near infrared ray absorptivity layered product is a layered product which has as indispensable the near infrared ray absorptivity coloring matter content layer which has the property which absorbs the near infrared ray which is a heat ray, and it attracts attention from a viewpoint of energy saving in recent years as the heat ray absorption plate which can cover a heat ray and can prevent a temperature rise, or a film, making light penetrate. For example, it is used for windowpanes, such as a building, and a residence, a car, an arcade, a greenhouse, etc.

[0003] Such a near infrared ray absorptivity coloring matter content layer of a near infrared ray absorptivity layered product is prepared by making a heat ray absorbent and binder resin contain in usual, and an inorganic system particle and organic system coloring matter are used as a heat ray absorbent. However, by the inorganic system particle, there was a problem that near infrared ray absorptivity ability with a wavelength of 1000nm or less was low, and could not fully prevent a temperature rise from a viewpoint of energy saving. Moreover, since the weatherability of a heat ray absorption plate or a film became less enough [ organic system coloring matter ] as when near infrared ray absorptivity ability is gradually lost by sunlight etc. in a heat ray absorption plate or a film, there was room of the research for making near infrared ray absorptivity ability maintain.

[0004] The near infrared ray absorption plate obtained by sticking the ethylene-vinyl acetate (EVA) system adhesive property polymer containing near infrared ray absorption coloring matter and a specific ultraviolet ray absorbent, and glass or a resin plate, and producing it is indicated by JP,7-178861,A. With this near infrared ray absorption plate, since near infrared ray absorption coloring matter decomposes by light with a wavelength of 250-400nm, color fastness to light is raised by using the ultraviolet ray absorbent which can absorb the light of that wavelength. However, there was room of the research for making the engine performance which near infrared ray absorption coloring matter that it is simpler and certainly has maintain by devising the approach of controlling degradation of near infrared ray absorption coloring matter.

[0005]

[Problem(s) to be Solved by the Invention] This invention is made in view of the above, and aims to let it offer the near infrared ray absorptivity layered product which can demonstrate the weatherability which was controlled and was excellent that near infrared ray absorptivity coloring matter deteriorates.

[0006]

[Means for Solving the Problem] This invention is a near infrared ray absorptivity layered product which has a transparence plastic film base material on both sides of a near infrared ray absorptivity coloring matter content layer which have absorption maximum wavelength in 780nm - 1200nm and which is structure. The above-mentioned transparence plastic film base material is the quality of the material from which moisture vapor transmission serves as 2-24h or less of 1000 g/m. The above-

mentioned near infrared ray absorptivity layered product The near infrared ray absorbing-power survival rate 192 hours [ by the accelerated weathering test in ultraviolet-rays auto fade meter ] after a continuous irradiation trial is the near infrared ray absorptivity layered product which is 70% or more.

[0007] The time of examining many things about the near infrared ray absorptivity layered product which has the near infrared ray absorptivity coloring matter content layer this invention persons cover a heat ray, making light penetrating, It first notes that the water contained in a near infrared ray absorptivity coloring matter content layer is one of the causes which degrades near infrared ray absorptivity coloring matter. When moisture permeability considered as the structure of having a low transparence plastic film base material at the both sides of a near infrared ray absorptivity coloring matter content layer, permeation of the moisture to a near infrared ray absorptivity coloring matter content layer is intercepted and the content of water was decreased, it found out that degradation of near infrared ray absorptivity coloring matter could be controlled. Moreover, by having a binder layer between a near infrared ray absorptivity coloring matter content layer and a transparence plastic film base material Having sufficient fundamentality ability which a near infrared ray absorptivity layered product can use for various applications, and when light has an ultraviolet absorption layer on the transparence plastic film base material of the side by which incidence is carried out Improving more finds out, and the weatherability of a near infrared ray absorptivity layered product hits on an idea for the above-mentioned technical problem to be splendidly solvable, and reaches this invention. Since the ethylene-vinyl acetate system resin (EVA) by the Prior art has the low solubility to an organic solvent, it is using the resin (or resin with the good solubility to an organic solvent) and the organic solvent soluble pigment of a solvent system by this invention to formation of the coat by the usual coating being difficult, and since a coat can be formed by coating, it is possible to form a near infrared ray absorptivity coloring matter content layer simpler. Below, this invention is explained in full detail.

[0008] The near infrared ray absorptivity layered product of this invention is the structure of having a transparence plastic film base material on both sides of a near infrared ray absorptivity coloring matter content layer (only henceforth a near infrared ray absorptivity coloring matter content layer) which have absorption maximum wavelength in 780nm - 1200nm. Although it has a transparence plastic film base material, a near infrared ray absorptivity coloring matter content layer, and a transparence plastic film base material as indispensable in this order as structure of such a near infrared ray absorptivity layered product, you may have other layers and it is not necessary to have other than these. The desirable gestalt of the near infrared ray absorptivity layered product of this invention is a near infrared ray absorptivity layered product film, and is desirable as the thickness, for example. [ of 2-2000 micrometers ] It is 5-1600 micrometers, and still more preferably, it is 20-800 micrometers and is 30-500 micrometers most preferably. By considering as such a gestalt, it becomes possible in the application as a film to control degradation of near infrared ray absorptivity coloring matter, and to fully demonstrate the operation effectiveness of this invention.

[0009] The thickness of the transparence plastic film base material of the both sides of the above-mentioned near infrared ray absorptivity coloring matter content layer may be the same, and may differ. As thickness of a transparence plastic film base material, it is desirable that it is 1-1000 micrometers. It becomes possible to intercept invasion of the moisture to a near infrared ray absorptivity coloring matter content layer so that it may mention later that it is 1-1000 micrometers, and degradation of near infrared ray absorptivity coloring matter can fully be conjointly controlled with specifying the quality of the material of a transparence plastic film base material, and the operation effectiveness of this invention will fully be demonstrated. Moreover, in this invention, it is more desirable to set thickness of a transparence plastic film base material to 1-800 micrometers. When a transparence plastic film base material is made into such thickness, a near infrared ray absorptivity layered product will be made thin, and can be applied suitable for various applications. Furthermore, it is 5-600 micrometers preferably. Moreover, a design, printing, coloring, etc. may be performed to the film in the range in which no trouble is in transparency.

[0010] The above-mentioned transparence plastic film base material is a base material of the shape of a film formed from plastics. It may be transparent and colorless, and a transparence plastic film base

material may be colored transparence, and may be translucent. Moreover, the quality of the material of the transparence plastic film base material of the both sides of a near infrared ray absorptivity coloring matter content layer may be the same, and may differ.

[0011] The above-mentioned transparence plastic film base material is the quality of the material from which moisture vapor transmission serves as 2-24h or less of 1000 g/m. That is, it means using the plastic film of the quality of the material which can make moisture vapor transmission of such a transparence plastic film base material 2-24h or less of 1000 g/m. Moisture vapor transmission is one index to show the water vapor content which a transparence plastic film base material makes penetrate with the passage of time, and means the value computed using the following type by the following measuring method.

[0012] Measuring method JIS of moisture vapor transmission Based on Z0208, it measures on condition that 40 degrees C and 90%RH, and asks for moisture vapor transmission.

[0013] If the moisture vapor transmission of the above-mentioned transparence plastic film base material exceeds 2-24h of 1000 g/m, since permeation of the moisture to a near infrared ray absorptivity coloring matter content layer cannot fully be intercepted, it becomes impossible to fully control degradation of near infrared ray absorptivity coloring matter. It is 2-24h or less of 500 g/m, and is 2-24h or less of 300 g/m more preferably.

[0014] It is desirable that it is the film formed using polyester system resin, such as polyethylene terephthalate (PET), polycarbonate resin, acrylic resin, polyethylene resin, polypropylene resin, polystyrene resin, polyvinyl chloride resin, polysulfone resin, polyether sulphone resin, polyamide resin, polyimide resin, etc. as a subject, for example as plastic film of the quality of the material which can make moisture vapor transmission of the above-mentioned transparence plastic film base material 2-24h or less of 1000 g/m. Also in these, it is the point of the balance of the optical physical properties of the obtained transparence plastic film layered product, reinforcement, and workability, and polyester system resin and polycarbonate resin are suitable.

[0015] The above-mentioned transparence plastic film base material may be constituted by the monolayer, and may be constituted by the layered product more than two-layer (compound layer). The thickness and the quality of the material of each class which constitute a compound layer may be the same, and may differ from each other. Moreover, as for a transparence plastic film base material, easily-adhesive processing of one side or both sides may be carried out. As the above-mentioned easily-adhesive processing, surface treatment; polyester, such as corona discharge treatment, plasma treatment, alkali-metal solution processing, and high frequency sputter etching processing, Pori (meta) acrylic ester, polyurethane, halogenation polyolefine, etc. the under coat processing by such mixture and the reactant, etc. are meant, for example. In this case, it is desirable to have a near infrared ray absorptivity coloring matter content layer on the processing side of the transparence plastic film base material which carried out easily-adhesive processing of one side or both sides. Adhesion with a transparence plastic film base material and a near infrared ray absorptivity coloring matter content layer becomes stronger by this, and it is hard coming to generate peeling and degradation between a transparence plastic film base material and a near infrared ray absorptivity coloring matter content layer.

[0016] It is mentioned that the near infrared ray absorptivity layered product of this invention is [ few falls of the near infrared ray absorptivity ability of the near infrared ray absorptivity coloring matter after an accelerated weathering test ] as physical properties which degradation of near infrared ray absorptivity ability is characterized by few things again, and a layered product has namely, has a high near infrared ray absorbing-power survival rate, and the near infrared ray absorbing-power survival rate 192 hours [ by the accelerated weathering test in ultraviolet-rays auto fade meter ] after a continuous irradiation trial is 70% or more. The near infrared ray absorbing-power survival rate which performs the accelerated weathering test in ultraviolet-rays auto fade meter using a near infrared ray absorptivity layered product, and is specifically searched for by the following evaluation approach is 70% or more. It is 80% or more and is 90% or more more preferably.

[0017] The permeability of the light in the absorption maximum wavelength in the near infrared region of the evaluation approach near infrared ray absorptivity layered product of a near infrared ray

absorbing-power survival rate is measured with a spectrophotometer ( $T_i$  initial value). Moreover, the permeability in the wavelength concerned of a base material film is measured ( $T_0$ ). Using this layered product, the continuous irradiation trial in ultraviolet-rays auto fade meter (the Suga Test Instruments Co., Ltd. make, trade name "FAL-AU-B") is performed for 192 hours, it considers as an accelerated weathering test, and the permeability in the absorption maximum wavelength in the near infrared region after a trial is measured ( $T$ ). From such measured value, near infrared ray absorbing-power survival rate  $R$  (%) is calculated by the degree type.

$$R(\%) = (T_0 - T) / (T_0 - T_i)$$

[0018] It is suitable that it is the layer formed from the near infrared ray absorptivity resin constituent which is not limited as a near infrared ray absorptivity coloring matter content layer in this invention especially as long as near infrared ray absorptivity coloring matter is contained, for example, comes to contain near infrared ray absorptivity coloring matter and binder resin.

[0019] The above-mentioned near infrared ray absorptivity coloring matter is coloring matter which has absorption maximum wavelength, may be independently used for 780-1200nm, and may use two or more sorts together. When two or more sorts from which the absorption property of a near infrared ray differs are used together, the absorption effect of a near infrared ray may improve. In addition, near infrared ray absorptivity is used in semantics equivalent to heat ray absorptivity.

[0020] Although not limited especially as the above-mentioned near infrared ray absorptivity coloring matter, it is desirable to use the coloring matter which has the solubility to an organic solvent, i.e., the near infrared ray absorptivity coloring matter of organic solvent fusibility, for example, it is suitable as solubility to an organic solvent to use the near infrared ray absorptivity coloring matter whose solubility which made the organic solvent 100 mass % is more than 0.01 mass %. It is not limited especially as an organic solvent in organic solvent fusibility, for example, one sort [, such as ketone solvent; dimethylformamide, ], such as ester solvent; acetones, such as alcoholic solvent; butyl acetate, such as aromatic series system solvent; iso-propyl alcohol, such as toluene and a xylene, n-butyl alcohol, propylene glycol methyl ether, and dipropylene glycol methyl ether, ethyl acetate, and a cellosolve acetate, a methyl ethyl ketone, and methyl isobutyl ketone, or two sorts or more are mentioned.

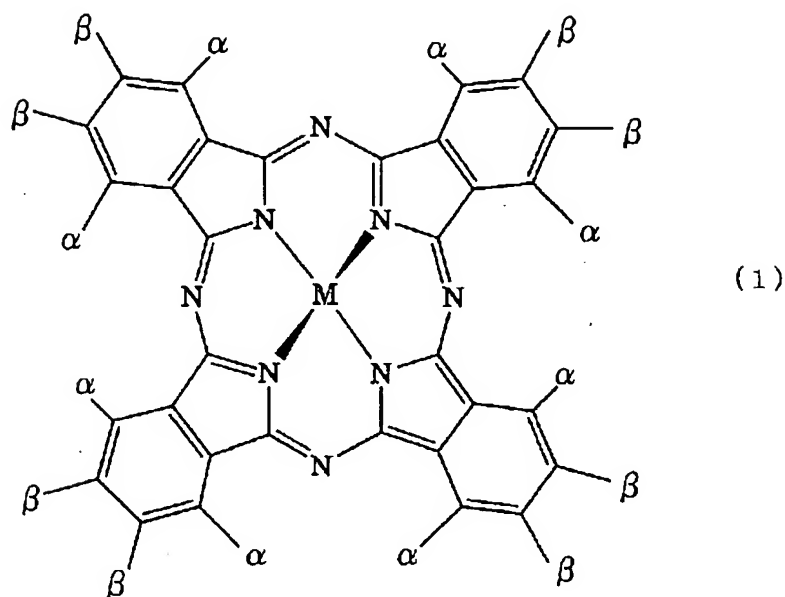
[0021] It is desirable to use phthalocyanine system coloring matter as a class of the above-mentioned near infrared ray absorptivity coloring matter, for example, since it excels in near infrared ray absorptivity ability and organic solvent fusibility also in these although phthalocyanine system coloring matter, naphthalocyanine system coloring matter, anthraquinone system coloring matter, naphthoquinone system coloring matter, etc. are mentioned.

[0022] The phthalocyanine system in this specification refers to a phthalocyanine, a phthalocyanine complex or a phthalocyanine, and a phthalocyanine complex, and it has one or more sorts of one or more substituents of OR, SR, NHR, or NRR' on the benzene ring of a phthalocyanine frame. R and R' expresses the aralkyl radical of the same, or the phenyl group which may differ and may have a substituent, the alkyl group of carbon numbers 1-20 or carbon numbers 7-20 here. In addition, it is desirable that one in a substituent is the phthalocyanine permuted by NHR.

[0023] It sets to this invention and the above-mentioned near infrared ray absorptivity coloring matter is the following general formula (1).;

[0024]

[Formula 2]



[0025] the inside of a formula and alpha are the same -- or it differs, SR1, OR2, NHR3, or a halogen atom is expressed, and NHR3 is made indispensable. R1 and R2 And R3 The aralkyl radical of the same, or the phenyl group which may differ and may have a substituent, the alkyl group of carbon numbers 1-20 or carbon numbers 7-20 is expressed. beta is the same -- or -- differing -- SR1 and OR2 or a halogen atom -- expressing -- SR1 Or OR2 Suppose that it is indispensable. However, at least one of alpha and beta is a halogen atom or OR2. Suppose that it is indispensable. M expresses a non-metal, a metal, a metallic oxide, or a metal halogenide. It is desirable that it is the compound expressed. Thereby, the operation effectiveness of this invention can more fully be demonstrated.

[0026] In the above-mentioned general formula (1) as an alkyl group of carbon numbers 1-20 For example, a methyl group, an ethyl group, a propyl group, an isopropyl group, n-butyl, An isobutyl radical, sec-butyl, tert-butyl, n-pentyl radical, An isopentyl radical, a neopentyl radical, 1, 2-dimethyl propyl group, n-hexyl group, 1, 3-dimethyl butyl, 1-isopropyl propyl group, 1, 2-dimethyl butyl, The alkyl group of straight chains, such as n-heptyl radical, 1, 4-dimethyl pentyl radical, a 2-methyl-1-isopropyl propyl group, a 1-ethyl-3-methylbutyl radical, n-octyl radical, and a 2-ethylhexyl radical, or the letter of branching; annular alkyl groups, such as a cyclohexyl radical, etc. are mentioned. As an aralkyl radical of carbon numbers 7-20, benzyl, a phenethyl radical, etc. are mentioned, for example. As a halogen atom, for example, a fluorine atom, a chlorine atom, a bromine atom, an iodine atom, etc. are mentioned, and it is desirable that it is a fluorine atom.

[0027] the above R1 and R2 And R3 the phenyl group which can be set, the alkyl group of carbon numbers 1-20, or the aralkyl radical of carbon numbers 7-20 -- a substituent -- one piece -- or you may have two or more pieces. As such a substituent, a halogen atom, an acyl group, an alkyl group, an alkoxy group, a halogenation alkoxy group, a nitro group, the amino group, an alkylamino radical, an alkyl carbonylamino radical, an arylamino radical, an aryl carbonylamino radical, a carbonyl group, an alkoxy carbonyl group, etc. are mentioned, for example.

[0028] In M in the above-mentioned general formula (1), a non-metal means that they are atoms other than a metal, for example, two hydrogen atoms. It becomes the structure which the hydrogen atom has specifically combined with two nitrogen atoms which exist in the central part of phthalocyanine structure, which may have a substituent, and which face. As a metal, iron, magnesium, nickel, cobalt, copper, palladium, zinc, vanadium, titanium, an indium, tin, etc. are mentioned, for example. As a metallic oxide, titanyl, vanadyl, etc. are mentioned, for example. As a metal halogenide, an aluminum chloride, indium chloride, a germanium chloride, chlorination tin, a silicon chloride, etc. are mentioned, for example. As M, it is desirable that they are a metal, a metallic oxide, or a metal halogenide, and, specifically, nickel, cobalt, copper, zinc, iron, vanadyl, dichloro tin, etc. are mentioned. They are zinc,



cobalt, vanadyl, and dichloro tin more preferably.

[0029] as a desirable gestalt of a compound expressed with the above-mentioned general formula (1), 4-8 of eight beta are the same -- or -- differing -- SR1 Or OR2 It is expressing. all of eight beta are the same more preferably -- or -- differing -- SR1 Or OR2 It is expressing. As such near infrared ray absorptivity coloring matter, for example  $\text{ZnPc}(\text{PhS})_8 3 (\text{PhNH}) \text{F}5$ ,  $\text{ZnPc}(\text{PhS})_8 4 (\text{PhNH}) \text{F}4$  and  $\text{ZnPc}(\text{PhS})_8 5 (\text{PhNH}) \text{F}3$ ,  $\text{ZnPc}(\text{PhS})_8 4 (\text{PhCH}_2 \text{NH}) \text{F}4$  and  $\text{ZnPc}(\text{PhS})_8 5 (\text{PhCH}_2 \text{NH}) \text{F}3$ ,  $\text{ZnPc}(\text{PhS})_8 6 (\text{PhCH}_2 \text{NH}) \text{F}2$ ,  $\text{CuPc}(\text{PhS})_8 7 (\text{PhNH}) \text{F}$ ,  $\text{CuPc}(\text{PhS})_8 6 (\text{PhNH}) \text{F}2$ ,  $\text{CuPc}(\text{PhS})_8 5 (\text{PhNH}) \text{F}3$ , and  $\text{VOPc}(\text{PhO})_8 (\text{PhCH}_2 \text{NH})_5 \text{F}3$ ,  $\text{VOPc}(\text{PhO})_8 6 (\text{PhCH}_2 \text{NH}) \text{F}2$  and  $\text{VOPc}(\text{PhO})_8 8 (\text{PhCH}_2 \text{NH})$ ,  $\text{VOPc}(\text{PhS})_8 8 (\text{PhCH}_2 \text{NH})$  and  $\text{VOPc}8 (2, 5\text{-Cl}_2 \text{PhO}) (\text{CH}_3)_4 \{\text{Ph}(\text{CH}_3) \text{CHNH}\}_3 \text{F}$ ,  $\text{VOPc}(2, 5\text{-Cl}_2 \text{PhO})_8 \{\text{Ph}(\text{CH}_3)_4 (\text{CH}_2 \text{NH})_4 \text{--}\} \text{CuPc}(2, 5\text{-Cl}_2 \text{PhO})_8 \{2 \text{ and } 6\text{-(CH}_3)_2 \text{PhO}\}_4 \{\text{Ph}(\text{CH}_2 \text{NH})_4 \text{--}\} \text{CuPc}8 (\text{PhS}) \{2 \text{ and } 6\text{-(CH}_3)_2 \text{PhO}\}_4 4 (\text{PhCH}_2 \text{NH})$ ,  $\text{VOPc}(\text{CH}_3)_8 (4\text{-CNPhO}) (\text{CH}_3)_4 4$ ,  $\text{ZnPc}$  (the phthalocyanine compound expressed with the abbreviated name of 2 and 6- $\text{Cl}_2 \text{PhO}\}_8 \{2, 6\text{-Br}_2\text{-4-(CH}_3) \text{PhO}\}_4 \{\text{Ph}(\text{CH}_3) \text{CHNH}\}_3 \text{F}$  is mentioned.) moreover, four of eight alpha are the same also in these compounds -- or -- differing -- OR2 Or with the compound showing a halogen atom For example,  $\text{ZnPc}(\text{PhS})_8 3 (\text{PhNH}) \text{F}5$  and  $\text{ZnPc}(\text{PhS})_8 4 (\text{PhNH}) \text{F}4$ ,  $\text{ZnPc}(\text{PhS})_8 4 (\text{PhCH}_2 \text{NH}) \text{F}4$  and  $\text{VOPc}8 (2, 5\text{-Cl}_2 \text{PhO}) (\text{CH}_3)_4 \{\text{Ph}(\text{CH}_3) \text{CHNH}\}_3 \text{F}$ ,  $\text{VOPc}(2, 5\text{-Cl}_2 \text{PhO})_8 \{\text{Ph}(\text{CH}_3)_4 (\text{CH}_2 \text{NH})_4 \text{--}\} \text{CuPc}(2, 5\text{-Cl}_2 \text{PhO})_8 \{\text{Ph}(\text{CH}_3)_4 (\text{CH}_2 \text{NH})_4 \text{--}\} \text{CuPc}8 (\text{PhS}) \{2 \text{ and } 6\text{-(CH}_3)_2 \text{PhO}\}_4 4 (\text{PhCH}_2 \text{NH})$ ,  $\text{VOPc}(\text{CH}_3)_8 (4\text{-CNPhO}) (\text{CH}_3)_4 4$ ,  $\text{ZnPc}$  (2, the compound generally expressed with the abbreviated name of 6- $\text{Cl}_2 \text{PhO}\}_8 \{2, 6\text{-Br}_2\text{-4-(CH}_3) \text{PhO}\}_4 \{\text{Ph}(\text{CH}_3) \text{CHNH}\}_3 \text{F}$  are mentioned.) In the abbreviated name of the above-mentioned compound, Pc expresses a phthalocyanine nucleus, after Pc, expresses eight substituents permuted at least by beta, and expresses eight substituents permuted by the alpha position after that. Moreover, Above Ph expresses a phenyl group. Furthermore, specifically, the above-mentioned cable address is a central metal :P Eight substituents like c:beta: Express eight substituents of an alpha position. For example,  $\text{ZnPc}(\text{PhS})_8 3 (\text{PhNH}) \text{F}5$  When it explains, it is  $\text{Zn Pc } 8 (\text{PhS}). (\text{PhNH}) \text{ Three F}5$  The underline section corresponds to the upper explanation.

[0030] It is desirable to consider as 0.0005 - 20 weight section, for example to the binder resin 100 weight section as amount of the above-mentioned near infrared ray absorptivity coloring matter used. When there is a possibility that near infrared ray absorptivity ability with the sufficient near infrared ray absorptivity coloring matter content layer formed from a near infrared ray absorptivity resin constituent as it is under the 0.0005 weight section may not be demonstrated and 20 weight sections are exceeded, there is a possibility that the physical properties of a near infrared ray absorptivity coloring matter content layer may fall. More preferably, it is 0.0015 - 10 weight section, and is 0.002 - 7 weight section still more preferably. Moreover, it is desirable to set up suitably with the thickness of a near infrared ray absorptivity coloring matter content layer, for example, it is desirable to consider as 0.5 - 20 weight section by 10 micrometers in thickness, and it is more desirable to consider as 1.0 - 10 weight section. When considering as a near infrared ray absorptivity coloring matter content layer with a thickness of 3mm, it is desirable to consider as the 0.002 - 0.06 weight section, and it is more desirable to consider as the 0.005 - 0.03 weight section. It is desirable to consider as the 0.0005 - 0.02 weight section by 10mm in thickness, and it is more desirable to consider as the 0.0010 - 0.01 weight section. Furthermore, as weight contained in per unit area of a near infrared ray absorptivity coloring matter content layer, it is 0.01 - 2.4 g/m<sup>2</sup>, for example. Carrying out is desirable. 0.01 g/m<sup>2</sup> There is a possibility that an operation of near infrared ray absorptivity coloring matter may not fully be demonstrated as it is the following, and it is 2.4 g/m<sup>2</sup>. When it exceeds, there is a possibility that the manufacturing cost of a near infrared ray absorptivity coloring matter content layer may become high. more -- desirable -- 0.05 - 1.0 g/m<sup>2</sup> it is .

[0031] It is desirable that the water absorption of a near infrared ray absorptivity coloring matter content layer is below 2 mass % in this invention. Moreover, it is so desirable that the water absorption of a near infrared ray absorptivity coloring matter content layer is close to 0 mass %. When the water absorption of a near infrared ray absorptivity coloring matter content layer exceeds 2 mass %, the content of the water in a near infrared ray absorptivity coloring matter content layer cannot be decreased, and there is a possibility that the operation effectiveness of this invention cannot be demonstrated so that degradation of near infrared ray absorptivity coloring matter can fully be controlled. More preferably, it is below 1

mass % and is below 0.8 mass % still more preferably. The water absorption of a near infrared ray absorptivity coloring matter content layer shows the weight rate (mass %) which increases when the near infrared ray absorptivity coloring matter content layer (coating film) formed with the near infrared ray absorptivity resin constituent which blended a curing agent, various additives, etc. according to the near infrared ray absorptivity coloring matter and the need other than binder resin contains water with the passage of time. The water absorption of a near infrared ray absorptivity coloring matter content layer is computed using the following formula by the following measuring method.

[0032] Weight (W0) is measured for coating \*\*\*\* 3cmx3cm with a measuring method thickness [ of the water absorption of a near infrared ray absorptivity coloring matter content layer ] of 1mm after 12-hour desiccation at 80 degrees C under the reduced pressure condition of 30 or less mPas, and let this be initial value. Subsequently, after being immersed in water and saving for 20 days at a room temperature (25 degrees C), it takes out and weight (W1) is measured. The water absorption of a near infrared ray absorptivity coloring matter content layer (coating film) is computed using the following type. Water absorption (mass %) =  $\{(W1-W0) / W0\} \times 100$  [0033] of a near infrared ray absorptivity coloring matter content layer In this invention, in addition, for measurement of the water absorption of a near infrared ray absorptivity coloring matter content layer The prepared near infrared ray absorptivity resin constituent so that desiccation thickness may become the base material of glass with 1mm For example, after coating, It is possible to measure the water absorption of a near infrared ray absorptivity coloring matter content layer on certain conditions by drying on the conditions shown below and using the near infrared ray absorptivity coloring matter content layer (coating film) exfoliated and produced from the base material. Moreover, although there are two kinds of operation gestalten, the case where make resin and a curing agent construct a bridge and it considers as a hardening paint film about a curing agent, and when considering without a curing agent as a dry paint film, in the near infrared ray absorptivity coloring matter content layer in this invention In making a curing agent construct a bridge and considering as a hardening paint film A curing agent as shown below is blended, a near infrared ray absorptivity resin constituent is prepared, and it becomes possible by producing a near infrared ray absorptivity coloring matter content layer on condition that the following, and presenting measurement of water absorption to measure the water absorption of a near infrared ray absorptivity coloring matter content layer under certain conditions. The near infrared ray absorptivity coloring matter content layer production conditions for water absorption measurement are shown concretely below.

(1) With no curing agent (lacquer)

desiccation condition: -- 80 degrees C -- after 3 minutes and 50 degrees C -- the class:Sumitomo Bayer urethane company make of a seven-day curing-agent [ (2) ]:isocyanate compound curing agent, and "Sumi Joule N3200" (trade name)

curing agent loadings: -- hydroxyl-group =1/1 (mole ratio) hardening condition: of the isocyanate radical / binder resin of a curing agent -- 80 degrees C -- after 3 minutes and 50 degrees C -- the product made from class:Mitsui SAITEKKU of a seven-day curing-agent [ (3) ]:aminoplast resin curing agent, and "Cymel 325" (trade name)

Curing catalyst: Product made from Mitsui SAITEKKU, "catalyst 296-9" (trade name)

Curing-agent loadings: Binder resin / curing agent / curing catalyst =80/19/1 (solid content weight ratio)

Hardening conditions: It is 110 degrees C and is 30 minutes [0034]. It is desirable that the glass transition temperature (Tg) of the above-mentioned binder resin is -80-160 degrees C in this invention again. By this, the weatherability of binder resin itself will improve, and while the near infrared ray absorptivity ability of a near infrared ray absorptivity coloring matter content layer continues conjointly with controlling the content of the water in a near infrared ray absorptivity coloring matter content layer, the weatherability and the physical properties of the near infrared ray absorptivity coloring matter content layer itself will improve more. Preferably, it is -50-130 degrees C, and it is 20-110 degrees C, and is 40-100 degrees C still more preferably.

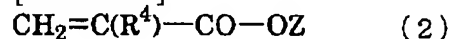
[0035] It is desirable to select the resin with the good solubility to an organic solvent which can form a near infrared ray absorptivity coloring matter content layer with the coating method which is a method of forming the desirable near infrared ray absorptivity coloring matter content layer in this invention as

the above-mentioned binder resin. As a class of the above-mentioned binder resin, for example Acrylic (meta) resin, Acrylic urethane system resin, polyvinyl chloride system resin, polyvinylidene chloride resin, (Meta) Melamine system resin, urethane system resin, styrene resin, alkyd system resin, Phenol system resin, epoxy system resin, polyester system resin, and acrylic (meta) silicone system resin, Alkyl polysiloxane system resin, silicone resin, silicone alkyd resin, Denaturation silicone resin, such as silicone urethane resin and silicone polyester resin, Fluororesin, such as polyvinylidene fluoride and a fluoro olefin vinyl ether polymer, etc. may be mentioned, thermoplastics is sufficient, and hardenability resin, such as thermosetting resin, moisture hardenability resin, ultraviolet-rays hardenability resin, and electron ray hardenability resin, is sufficient. Moreover, organic system binder resin, such as synthetic rubber, such as ethylene-propylene copolymerization rubber, polybutadiene rubber, a styrene butadiene rubber, and acrylonitrile-butadiene rubber, or natural rubber; binder resin with inorganic conventionally well-known system binders, such as a silica sol, alkali silicate, a silicone alkoxide, and those (hydrolysis) condensates, phosphate, etc. is mentioned. These may be used independently and may use two or more sorts together. It is desirable that they are acrylic (meta) resin, acrylic (meta) urethane system resin, acrylic (meta) silicone system resin, silicone resin, denaturation silicone resin, fluororesin, polyester system resin, and urethane system resin at the point of being able to dry at low temperature comparatively, being able to form a near infrared ray absorptivity coloring matter content layer, and moreover excelling in the weatherability of binder resin itself also in these. They are acrylic resin, acrylic silicone system resin, fluororesin, polyester system resin, and urethane system resin more preferably. Furthermore, they are acrylic (meta) resin, acrylic (meta) urethane resin, acrylic (meta) silicone system resin, and a fluororesin preferably. In addition, acrylic resin and methacrylic system resin may be generally expressed as acrylic resin.

[0036] At this invention, the above-mentioned binder resin is the following general formula also in the above-mentioned (meta) acrylic resin (2).;

[0037]

[Formula 3]



[0038] (R<sup>4</sup> expresses a hydrogen atom or a methyl group among a formula.) Z expresses the hydrocarbon group of carbon numbers 4-25. It is desirable when the polymer which comes to carry out the polymerization of the monomer component which makes indispensable the monomer expressed is used as binder resin. One sort of monomers expressed with a general formula (2) may be used, and may use two or more sorts together. Since it becomes what was excellent also in the weatherability of binder resin itself by this in addition to the endurance of near infrared ray absorptivity coloring matter improving, the weatherability of a near infrared ray absorptivity coloring matter content layer can be raised more. In this case, the above-mentioned near infrared ray absorptivity coloring matter content layer will be formed from the near infrared ray absorptivity resin constituent containing the polymer which comes to carry out the polymerization of the monomer component containing the monomer expressed with the above-mentioned general formula (2), and will become.

[0039] As a hydrocarbon group of the carbon numbers 4-25 expressed with Z, polynuclear hydrocarbon radicals, such as an alkyl group; bornyl radical of straight chains, such as alicyclic hydrocarbon radical; butyls, such as a cyclohexyl radical, a methylcyclohexyl radical, and cyclo dodecyl, an isobutyl radical, tert-butyl, a 2-ethylhexyl radical, a heptyl radical, an octyl radical, a nonyl radical, a decyl group, an undecyl radical, dodecyl, a pentadecyl group, and an octadecyl radical, or a branched chain and an isobornyl radical etc. be mentioned among the above-mentioned general formula (2), for example Also in these, it is desirable that they are an alicyclic hydrocarbon radical, the alkyl group of a branched chain, and a with a carbon numbers of six or more straight chain alkyl group. Furthermore, it is a with a carbon numbers of six or more alicyclic hydrocarbon radical preferably.

[0040] As a monomer expressed with the above-mentioned general formula (2), cyclohexyl (meta) acrylate, methylcyclohexyl (meta) acrylate, cyclo dodecyl (meta) acrylate, tert-butyl cyclohexyl (meta) acrylate, isobutyl (meta) acrylate, tert-butyl (meta) acrylate, lauryl (meta) acrylate, isobornyl (meta)

acrylate, stearyl (meta) acrylate, 2-ethylhexyl (meta) acrylate, etc. are mentioned, for example.

[0041] It is desirable to carry out to more than 30 mass %, for example as amount of the monomer used expressed with the above-mentioned general formula (2), if all monomer components are made into 100 mass %. There is a possibility that the weatherability of binder resin itself may not fully improve that it is under 30 mass %. It is more than 40 mass %, and still more preferably, it is more than 60 mass %, and is more than 80 mass % most preferably. It is not limited especially as other copolymerizable partial saturation monomers which can be used for the above-mentioned monomer component, for example, the following monomer etc. is mentioned. These may be used independently and may use two or more sorts together.

[0042] Alkyl-acid-phosphate system partial saturation monomer; 2-hydroxyethyl (meta) acrylate, such as partial saturation monomer; 2-(meta) AKURIRO yloxy ethyl acid phosphate which has carboxyl groups, such as an acrylic acid, an itaconic acid, and a maleic anhydride, (Meta) Hydroxypropyl (meta) acrylate, hydroxy butyl (meta) acrylate, caprolactone denaturation hydroxy (meta) acrylate (for example, the Daicel Chemical Industries, Ltd. make --) The partial saturation monomer which has a radical with active hydrogen, such as a trade name "the plaque cel FM"; Methyl (meta) acrylate, Acrylic ester, such as ethyl (meta) acrylate, propyl (meta) acrylate, isopropyl (meta) acrylate, and butyl (meta) acrylate (meta); the partial saturation monomer which has epoxy groups, such as glycidyl (meta) acrylate.

[0043] Acrylamide, N, and N'-dimethylaminoethyl (meta) acrylate, (Meta) The partial saturation monomer which has nitrogen atoms, such as N and N-diethylaminoethyl (meta) acrylate and imide (meta) acrylate; Ethylene glycol di(metha)acrylate, Triethylene glycol di(metha)acrylate, Tori propyleneglycol di(meth) acrylate, The partial saturation monomer which has halogen atoms, such as a partial saturation monomer; vinyl chloride which has two or more polymerization nature double bonds, TORIMECHI roll pro pantry (meta) acrylate, pentaerythritol tetrapod (meta) acrylate, etc.; Styrene, aromatic series partial saturation monomers [, such as alpha methyl styrene, ]; -- vinyl ester [, such as vinyl acetate, ]; -- vinyl ether.

[0044] In this invention, a polymerization nature ultraviolet absorption nature monomer and a polymerization nature ultraviolet-rays stability monomer can be used as a partial saturation monomer which carries out copolymerization to binder resin for the weatherproof improvement in a near infrared ray absorptivity coloring matter content layer. What is necessary is just to use the partial saturation monomer which has ultraviolet absorption nature machines, such as a benzotriazol system, a benzophenone system, and a triazine system, for the near infrared ray absorptivity coloring matter content layer especially in this invention, when ultraviolet-rays cutoff ability is still more nearly required. "RUVA93" (a trade name, the Otsuka chemistry company make), "BP-1A" (a trade name, the Osaka organic chemistry company make), etc. are specifically mentioned, and these can be used independently and also they may be used as occasion demands, combining two or more sorts suitably. Moreover, what is necessary is just to use the partial saturation monomer which has the ultraviolet-rays stability radical which has a steric hindrance piperidine radical, when the further weatherproof improvement in binder resin is required. "ADEKA stub LA-82", "ADEKA stub LA-87" (all are a trade name and the Asahi Denka Kogyo K.K. make), etc. are specifically mentioned, and these can be used independently and also they may be used as occasion demands, combining two or more sorts suitably.

[0045] For example, it can carry out with a polymerization method with conventionally well-known solution polymerization, a distributed polymerization, a suspension polymerization, an emulsion polymerization, etc., using a polymerization initiator as a polymerization method for manufacturing the above-mentioned binder resin. an organic solvent which it was not limited especially as a solvent in the case of performing solution polymerization, for example, was mentioned above -- one sort -- or two or more sorts can be used. What is necessary is just to set up suitably with polymerization conditions, the weight rate of the polymer in binder resin, etc. as amount of the solvent used.

[0046] It is not limited especially as the above-mentioned polymerization initiator, for example, the usual radical polymerization initiators, such as 2 and 2'-azobis - (2-methyl butyronitrile), tert-butyl peroxy-2-ethylhexanoate, 2,2'-azobis isobutyronitrile, benzoyl peroxide, and G tert-butyl peroxide, are mentioned. These may be used independently and may use two or more sorts together. Although what is

necessary is just to set up suitably as the amount used from the characteristic value of the polymer for which it asks etc., it is desirable to consider as 0.01 to 50 mass % for example, if a monomer component is made into 100 mass %. It is 0.05 to 20 mass % more preferably.

[0047] As polymerization conditions in the above-mentioned polymerization method, it is not limited especially that what is necessary is just to set up suitably with a polymerization method. For example, as polymerization temperature, it is desirable to consider as room temperature -200 degree C. It is 40-140 degrees C more preferably. What is necessary is just to set up suitably as reaction time, according to the presentation of a monomer component, the class of polymerization initiator, etc., so that a polymerization reaction may be completed.

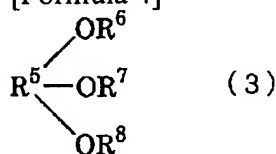
[0048] As number average molecular weight of the polymer which constitutes the above-mentioned binder resin, it is desirable that it is 1000-100000 for example. More preferably, it is 2000-80000 and is 4000-60000 still more preferably. In addition, number average molecular weight is the measured value standard [ GPC ] for polystyrene.

[0049] It is desirable to consider as 50 to 99.9995 mass % as amount of the above-mentioned binder resin used, for example, if near infrared ray absorptivity resin constituent 100 mass %. If there is a possibility that the physical properties of a near infrared ray absorptivity coloring matter content layer may become less enough in it being under 50 mass % and 99.9995 mass % is exceeded, since the weight rate of near infrared ray absorptivity coloring matter will decrease, there is a possibility that the near infrared ray absorptivity ability of a near infrared ray absorptivity coloring matter content layer may become less enough. More preferably, it is 60 to 99.9985 mass %, and is 70 to 99.998 mass % still more preferably.

[0050] As for the near infrared ray absorptivity coloring matter content layer in this invention, it is still more desirable to come to contain a dehydrating agent. Thereby, the content of the water in a near infrared ray absorptivity coloring matter content layer can be effectively controlled with binder resin. Although there are various things in an inorganic compound or an organic compound as a dehydrating agent, when using for this invention, the direction which volatilizes at the time of the near infrared ray absorptivity coloring matter content stratification, and does not remain after formation is desirable at a point without the degradation of a near infrared ray absorptivity coloring matter content layer. It is good to use the dehydrating agent of an organic system which is comparatively easy to volatilize at such a point. As an example of such a dehydrating agent, hydrolysis nature ester compounds, such as ORUTOGI acid TORIMECHIRU, a triethyl orthoformate, alt.acetic-acid TORIMECHIRU, alt.acetic-acid triethyl, methyl trimetoxysilane, gamma-methacryloxypropyl trimethoxy silane, vinyltrimetoxysilane, methyl silicate, and ethyl silicate, are mentioned, and one sort or two sorts or more can be used. The desirable gestalt of the chemical structure of such a dehydrating agent is for example, the following general formula (3).;

[0051]

[Formula 4]



[0052] (-- the inside of a formula, R5, R6, R7, and R8 are the same -- or it differs, the organic radical of carbon numbers 1-8 is expressed, and it is the organic radical of carbon numbers 1-3 preferably.) -- it is expressed. Moreover, it is desirable to consider as 1 - 20 weight section, for example to the binder resin 100 weight section as amount of the dehydrating agent used. When there is a possibility that the operation effectiveness of a dehydrating agent cannot fully be demonstrated as it is under 1 weight section and 20 weight sections are exceeded, there is a possibility that the physical properties of a near infrared ray absorptivity coloring matter content layer may fall. More preferably, it is 2 - 10 weight section, and is 3 - 7 weight section still more preferably.

[0053] Although it is usable that are not constructed [ bridge formation or / either ] a bridge as for a near

infrared ray absorptivity coloring matter content layer, it is more desirable for it to have been desirable, for example, for itself to have constructed the bridge independently, or for it to have blended the cross linking agent that it is a bridge formation paint film in respect of the improvement in endurance of coloring matter, and to form a hardening paint film in this invention. According to the class of the application for which it is used, or cross linking agent, the near infrared ray absorptivity resin constituent which will form the near infrared ray absorptivity coloring matter content layer in this invention can be stiffened on various hardening conditions, and can be used as a room-temperature-setting mold, a heat hardening mold, ultraviolet rays, or an electron ray hardening mold. Moreover, what is necessary is just to let especially the amount of the cross linking agent used, addition, the distributed approach, etc. be the amount used usually used for polyol, and addition and the distributed approach by the case where it is constituted by the polyol to which it is not limited, for example, binder resin has two or more hydroxyl groups in 1 intramolecular.

[0054] As the above-mentioned cross linking agent, the poly (block) isocyanate compound, aminoplast resin, etc. are mentioned by the case where binder resin is constituted by polyol, for example. These may be used independently and may use two or more sorts together.

[0055] The above-mentioned (block) poly isocyanate compound means the poly isocyanate compound and/or a block poly isocyanate compound. It will not be limited especially if it is the compound which has at least two isocyanate radicals in intramolecular as the above-mentioned poly isocyanate compound. For example, tolylene diisocyanate, xylylene diisocyanate, Diphenylmethane diisocyanate, 1,6-hexamethylene diisocyanate, Isophorone diisocyanate, 4,4'-methylenebis (cyclohexyl isocyanate), Lysine diisocyanate, trimethyl hexamethylene di-isocyanate, 1, 3-(isocyanate methyl) cyclohexane, 1,5-naphthalene diisocyanate, Poly isocyanates, such as triphenylmethane triisocyanate; the derivative (denaturation object) of the poly isocyanates, such as an adduct object of such poly isocyanates, a buret object, and an isocyanurate object, etc. is mentioned.

[0056] In order to make a bridge construct when carrying out stoving of the near infrared ray absorptivity resin constituent to the above-mentioned block poly isocyanate compound, and to raise the storage stability in ordinary temperature, the isocyanate radical of the poly isocyanate compound is usually blocked by the blocking agent. It is not limited especially as the above-mentioned blocking agent, for example, compounds, such as epsilon caprolactam, a phenol, cresol, an oxime, and alcohol, etc. are mentioned. As a commercial item of the above-mentioned (block) poly isocyanate compound, Sumi Joule N3200, Sumi Joule N3300, Sumi Joule BL3175, Desmodur N3400, Desmodur N3600, Desmodur VPLS2102 (a trade name, the Sumitomo Bayer urethane company make), duranate E-402-90T (a trade name, Asahi Chemical Industry Co., Ltd. make), etc. are mentioned, for example. Moreover, in order to prevent yellowing of the near infrared ray absorptivity coloring matter content layer formed from a near infrared ray absorptivity resin constituent, the non-xanthochroism poly isocyanate compound which does not have the isocyanate radical coupled directly with the ring is desirable.

[0057] Although not limited especially as amount of the above-mentioned (block) poly isocyanate compound used, it is desirable to make it the isocyanate radical in the poly (block) isocyanate compound become 0.6-1.4 mols to one mol of hydroxyl groups in binder resin for example. If it is less than 0.6 mols, since many hydroxyl groups of a reaction remain at last in a near infrared ray absorptivity resin constituent, the weatherability of the near infrared ray absorptivity coloring matter content layer formed using the near infrared ray absorptivity resin constituent obtained may fall. When it exceeds 1.4 mols, many unreacted isocyanate radicals in a near infrared ray absorptivity coloring matter content layer may remain, and a near infrared ray absorptivity coloring matter content layer may cause [ this ] foaming and milkiness with the moisture in air in response to the time of near infrared ray absorptivity coloring matter content layer hardening. It is 0.8-1.2 mols more preferably.

[0058] The above-mentioned aminoplast resin is the addition condensation object of the compound and formaldehyde which have amino groups, such as a melamine and guanamine, and is also called amino resin. It is not limited especially as the above-mentioned aminoplast resin. For example, a dimethylol melamine, Trimethylolmelamine, a tetra-methylol melamine, a PENTA methylol melamine, A hexa



methylol melamine, a perfect alkyl mold methylation melamine, a perfect alkyl mold butyl-ized melamine, A perfect alkyl mold isobutyl-ized melamine, a perfect alkyl mold mixed ether-ized melamine, A methylol type methylation melamine, an imino group mold methylation melamine, a methylol type mixed ether-ized melamine, Melamine resin, such as an imino group mold mixed ether-ized melamine; guanamine resin, such as butyl-ized benzoguanamine, methyl / ethyl mixing alkylation benzoguanamine, methyl / butyl mixing alkylation benzoguanamine, and butyl-ized glycoluril, etc. is mentioned.

[0059] As a commercial item of the above-mentioned aminoplast resin, Cymel 1128, Cymel 303, the my coat 506, Cymel 232, Cymel 235, Cymel 771, Cymel 325, Cymel 272, Cymel 254, Cymel 1170 (all are a trade name and a product made from Mitsui SAITEKKU), etc. are mentioned, for example.

[0060] It is desirable to blend so that it may not be limited especially as amount of the above-mentioned aminoplast resin used, for example, the solid content weight ratio of binder resin and aminoplast resin may be set to 9 / 1 - 6/4. When binder resin becomes less than 6/4, the near infrared ray absorptivity coloring matter content layer obtained becomes hard too much, and there is a possibility that the engine performance of a near infrared ray absorptivity coloring matter content layer may fall. If binder resin increases in number more than 9/1, since bridge formation will not fully progress, there is a possibility that the near infrared ray absorptivity coloring matter content layer obtained may become a thing inferior to a water resisting property or solvent resistance.

[0061] a curing catalyst for the above-mentioned near infrared ray absorptivity resin constituent to promote the crosslinking reaction of binder resin and a cross linking agent if needed -- one sort -- or two or more sorts may also be included. Although not limited especially as such a curing catalyst, it is desirable to, use catalysts, such as a dibutyl tin JIRAU rate and tertiary amine, for example, in using the above-mentioned (block) poly isocyanate compound, and when using the above-mentioned aminoplast resin, it is desirable to use an acid or basic curing catalyst.

[0062] as the compound except having mentioned above in the near infrared ray absorptivity resin constituent which will form the near infrared ray absorptivity coloring matter content layer in this invention -- for example, a solvent, an additive, etc. -- one sort -- or two or more sorts may be included. Although the organic solvent same with having mentioned above as such a solvent etc. is mentioned, in the case of the quality of the material with which a transparence plastic film base material is invaded with an aromatic solvent like a polycarbonate, for example, use of the alcohols solvent of aliphatic series is desirable. As an alcohols solvent of aliphatic series, isopropyl alcohol, n-butyl alcohol, propylene glycol monomethyl ether, dipropylene glycol monomethyl ether, etc. are mentioned, and one sort or two sorts or more can be used, for example. Moreover, the well-known additive generally used for the resin constituent which forms a film, the coating film, etc. as an additive can be used conventionally. For example, a leveling agent; Non-subtlety particles, such as a colloid silica and alumina sol, A defoaming agent, a dripping nature inhibitor, a silane coupling agent, a titanium white, a multiple oxide pigment, pigment; pigment agent;, such as carbon black, an organic pigment, and pigment intermediate field, -- an anti-oxidant; viscosity modifier; UV stabilizer; metal-deactivator; peroxide decomposition agent --; bulking agent; reinforcing agent; plasticizer; lubricant; anticorrosives; rusr-proofer; fluorescence brightening agent; organic and an inorganic system ultraviolet ray absorbent -- inorganic system heat ray absorbent; -- organic and inorganic flame proofing agent; -- an antistatic agent etc. is mentioned.

[0063] The above-mentioned near infrared ray absorptivity resin constituent can be prepared by mixing the compound mentioned above, and can form a near infrared ray absorptivity coloring matter content layer. It is not limited especially as an approach of forming a near infrared ray absorptivity coloring matter content layer with such a near infrared ray absorptivity resin constituent, and manufacturing a near infrared ray absorptivity layered product. For example, (1) near-infrared-ray absorptivity resin constituent is applied on a transparence plastic film base material. Stiffen the near infrared ray absorptivity resin constituent applied after that, and a near infrared ray absorptivity coloring matter content layer is formed. The dry laminate method which pressurizes or pastes [ pressurization heat ] up a transparence plastic film base material with a lamination roll on a near infrared ray absorptivity coloring matter content layer; After forming a near infrared ray absorptivity coloring matter content layer on (2)

transparence plastic film base material, The approach;(3) near-infrared-ray absorptivity resin constituent made into a layered product by sticking after applying a binder on a near infrared ray absorptivity coloring matter content layer or another transparence plastic film base material is fabricated and film-ized. By sticking between the transparence plastic film base materials of two sheets How to make it into a layered product; the approach of forming the layered product which multilayers (4) transparence plastic film base material and a near infrared ray absorptivity coloring matter content layer by the melting co-extruding method, and has a transparence plastic film base material on both sides of the near infrared ray absorptivity coloring matter content layer of two sheets etc. is mentioned. Also in these, it is desirable from the approach of (1) being simple.

[0064] In the manufacture approach of the above-mentioned near infrared ray absorptivity layered product, approaches, such as immersion, blasting, brush coating, a curtain flow coat, a gravure coat, a roll coat, a spin coat, a blade coat, a bar coat, a reverse coat, a die coat, a spray coat, and electrostatic coating, are mentioned, for example as an approach of applying a near infrared ray absorptivity resin constituent on a transparence plastic film base material. It can be made to be able to mix suitably and the organic solvent mentioned above to the near infrared ray absorptivity resin constituent in these cases can be applied. Moreover, as an approach of stiffening a near infrared ray absorptivity resin constituent, the approach of heating, the approach of irradiating ultraviolet rays and an electron ray, etc. are mentioned that what is necessary is just to set up suitably according to the class of binder resin etc. In addition, separately, as a line, production of a layered product and bridge formation of a near infrared ray absorptivity resin constituent are good, and may be performed to coincidence.

[0065] As thickness of the above-mentioned near infrared ray absorptivity coloring matter content layer, it is not limited that what is necessary is just to especially set up suitably by a use application etc. For example, it is desirable to make the thickness at the time of desiccation set to 0.5-1000 micrometers. It is 1-100 micrometers more preferably.

[0066] In the near infrared ray absorptivity layered product of this invention, you may have a binder layer further between the above-mentioned near infrared ray absorptivity coloring matter content layer and said transparence plastic film base material. Since adhesion with a near infrared ray absorptivity coloring matter content layer and a transparence plastic film base material becomes strong and it is hard coming to generate peeling and degradation between a near infrared ray absorptivity coloring matter content layer and a transparence plastic film base material by this, a near infrared ray absorptivity layered product will have sufficient fundamentality ability which can be used for various applications.

[0067] In the above-mentioned binder layer, it is not limited especially as a class of binder, but well-known adhesives, such as an urethane system, acrylic, and a silicone system, can be used. The thickness of a binder layer is 1-200 micrometers, and is 3-100 micrometers preferably. The above-mentioned binder layer may contain additives, such as an ultraviolet ray absorbent and UV stabilizer.

[0068] The photocatalyst stratum functionale and an antifog layer, a gas barrier layer, a recording layer, a conductive layer, and a magnetic layer can be further formed in the outermost superficial layer of one side of the above-mentioned near infrared ray absorptivity layered product, or both sides a silicon rebound ace court layer and for contamination-resistant improvement a sake [ on an abrasion-proof disposition ]. In addition, as for a gas barrier layer or a recording layer, it is desirable to prepare between a near infrared ray absorptivity coloring matter content layer and a transparence plastic film base material. It is not limited especially as a presentation or thickness of such a surface protective layer. Moreover, in order to control degradation of the near infrared ray absorptivity coloring matter by sunlight, it is desirable to prepare an ultraviolet absorption layer in the side in which the light of a near infrared ray absorptivity coloring matter content layer carries out incidence. Although such an ultraviolet absorption layer may be prepared between a transparence plastic film base material and a near infrared ray absorptivity coloring matter content layer and may be prepared on a transparence plastic film base material, it is desirable to prepare on a transparence plastic film base material.

[0069] It is suitable that it is the layer formed as the above-mentioned ultraviolet absorption layer from the resin constituent containing an ultraviolet absorption nature polymer and a cross linking agent, for example. Moreover, it is desirable that the acrylic polymer which cannot deteriorate easily to ultraviolet

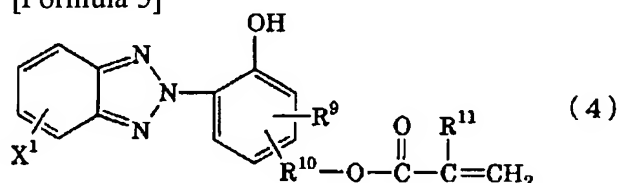


rays as an ultraviolet absorption nature polymer is included.

[0070] As the above-mentioned ultraviolet absorption acrylic polymer, it is the following general formula, for example (4).;

[0071]

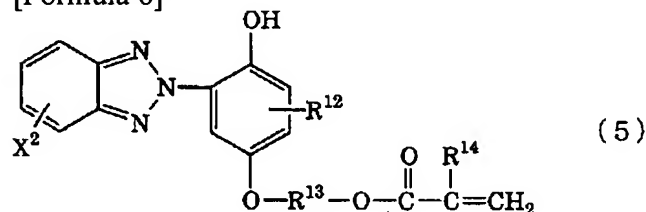
[Formula 5]



[0072] (R9 expresses a hydrogen atom or the hydrocarbon group of carbon numbers 1-8 among a formula.) R10 expresses the alkylene group of carbon numbers 1-6. R11 expresses a hydrogen atom or a methyl group. X1 Express \*\*, a hydrogen atom, a halogen atom, the hydrocarbon group of carbon numbers 1-8, the alkoxy group of carbon numbers 1-6, a cyano group, or a nitro group. The ultraviolet absorption nature monomer [it is hereafter called an ultraviolet absorption nature monomer (1)] expressed and/or the following general formula (5);

[0073]

[Formula 6]



[0074] (R12 expresses a hydrogen atom or the hydrocarbon group of carbon numbers 1-8 among a formula.) R13 expresses a carbon number 2 or the alkylene group of 3. R14 expresses a hydrogen atom or a methyl group. X2 Express \*\*, a hydrogen atom, a halogen atom, the hydrocarbon group of carbon numbers 1-8, the alkoxy group of carbon numbers 1-6, a cyano group, or a nitro group. It is desirable to come to carry out the polymerization of the monomer component containing the ultraviolet absorption nature monomer [for it to be hereafter called an ultraviolet absorption nature monomer (2)] expressed. This will have the ultraviolet absorption ability excellent in the ultraviolet absorption nature acrylic polymer. In addition, these monomers may be used independently, respectively and may use two or more sorts together.

[0075] As a hydrocarbon group of carbon numbers 1-8, aromatic hydrocarbon radicals, such as alicyclic hydrocarbon radical; phenyl groups, such as chain hydrocarbon radical; cyclo propyl groups, such as a methyl group, an ethyl group, a propyl group, an isopropyl group, butyl, an isobutyl radical, tert-butyl, a pentyl radical, a hexyl group, a heptyl radical, and an octyl radical, a cyclopentyl group, a cyclohexyl radical, a cycloheptyl radical, and a cyclo octyl radical, a tolyl group a xylyl group, benzyl, and a phenethyl radical, etc. be mentioned among the above-mentioned general formula (4) and (5), for example.

[0076] As an alkylene group of the above-mentioned carbon numbers 1-6, branched chain-like alkylene groups, such as straight chain-like alkylene group; propylene radicals, such as a methylene group, ethylene, a trimethylene radical, and a tetramethylen radical, 2-methyl trimethylene radical, and 2-methyl tetramethylen radical, etc. are mentioned, for example. Moreover, as a carbon number 2 or an alkylene group of 3, a carbon number 2 or the thing of 3 is mentioned out of these, for example. As the above-mentioned halogen atom, a fluorine atom, a chlorine atom, a bromine atom, an iodine atom, etc. are mentioned, for example. As an alkoxy group of the above-mentioned carbon numbers 1-6, a methoxy group, an ethoxy radical, a propoxy group, a butoxy radical, a pentoxy radical, a heptoxy radical, etc. are mentioned, for example.

[0077] As a concrete chemical name of the above-mentioned ultraviolet absorption nature monomer (1) For example, 2-[2'-hydroxy-5'-(methacryloyl oxymethyl) phenyl]-2H-benzotriazol, 2-[2'-hydroxy-5'-(methacryloiloxy-ethyl) phenyl]-2H-benzotriazol, 2-[2'-hydroxy-5'-(methacryloyl oxypropyl) phenyl]-2H-benzotriazol, 2-[2'-hydroxy-3'-tert-butyl-5'-(methacryloiloxy-ethyl) phenyl]-2H-benzotriazol, 2-[2'-hydroxy-5'-tert-butyl-3'-(methacryloiloxy-ethyl) phenyl]-2H-benzotriazol etc. is mentioned.

[0078] As a concrete chemical name of the above-mentioned ultraviolet absorption nature monomer (2), 2-[2'-hydroxy-5'-(beta-methacryloyl oxyethoxy)-3'-tert-buthylphenyl]-4-tert-butyl-2H-benzotriazol etc. is mentioned, for example.

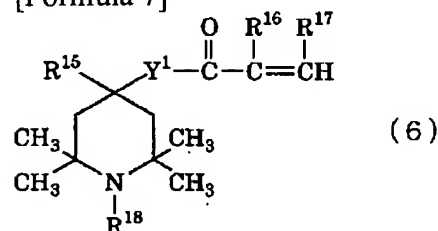
[0079] When the monomer component which forms an ultraviolet absorption nature acrylic polymer is made into 100 mass %, for example as amount of the above-mentioned ultraviolet absorption nature monomer (1) and the above-mentioned ultraviolet absorption nature monomer (2) used, it is desirable that it is 1 - 99.9 mass %. When there is a possibility of becoming less enough in it being under 1 mass %, the ultraviolet absorption ability, i.e., the ultraviolet-rays electric shielding capacity, of an ultraviolet absorption layer, and 99.9 mass % is exceeded, there is a possibility that compatibility with other resin and the cross linking agent which form an ultraviolet absorption layer may worsen. More preferably, it is one to 60 mass %, and is five to 50 mass % still more preferably.

[0080] As amount of the above-mentioned ultraviolet absorption nature monomer (1) and the above-mentioned ultraviolet absorption nature monomer (2) used, it is desirable that the products of thickness (micrometer) and the amount of the ultraviolet absorption nature monomer used to 100g of ultraviolet absorption layers (g) are 1-5000 again. When there is a possibility that the ultraviolet absorption ability of an ultraviolet absorption layer may become less enough in it being less than one and 5000 is exceeded, the thickness of an ultraviolet absorption layer becomes thick too much, or there is a possibility that the amount of an ultraviolet absorption nature monomer may increase too much, and the elongation of an ultraviolet absorption layer may fall. More preferably, it is 10-2500 and is 50-1000 still more preferably.

[0081] As the above-mentioned ultraviolet absorption acrylic polymer, it is the following general formula again (6).;

[0082]

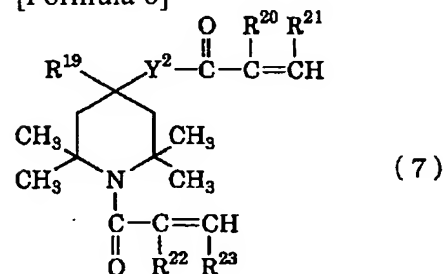
[Formula 7]



[0083] (R15 expresses a hydrogen atom or a cyano group among a formula.) R16 and R17 are the same - or it differs and a hydrogen atom or a methyl group is expressed. R18 expresses a hydrogen atom or the hydrocarbon group of carbon numbers 1-8. Y1 An oxygen atom or an imino group is expressed. The following general formula [ monomer / ultraviolet-rays stability / which is expressed / [it is hereafter called an ultraviolet-rays stability monomer (1)] ] (7);

[0084]

[Formula 8]



[0085] (R19 expresses a hydrogen atom or a cyano group among a formula.) R20, R21, R22, and R23 are the same -- or it differs and a hydrogen atom or a methyl group is expressed. Y2 An oxygen atom or an imino group is expressed. It is desirable to come to copolymerize the monomer component containing at least one sort in the ultraviolet-rays stability monomer [for it to be hereafter called an ultraviolet-rays stability monomer (2)] expressed. This will have ultraviolet absorption ability and ultraviolet-rays stability ability excellent in the ultraviolet absorption nature acrylic polymer. Moreover, it is desirable to come to copolymerize the monomer component containing the monomer expressed with the above-mentioned general formula (2). In addition, these monomers may be used independently, respectively and may use two or more sorts together. As a hydrocarbon group of carbon numbers 1-8, having mentioned above and the same thing are mentioned among the above-mentioned general formula (6), for example.

[0086] As a concrete chemical name of the above-mentioned ultraviolet-rays stability monomer (1) For example, 4-(meth)acryloyloxy - 2, 2, 6, and 6-tetramethylpiperidine, 4-(meta) acryloylamino - 2, 2, 6, and 6-tetramethylpiperidine, 4-(meth)acryloyloxy - 1, 2, 2, 6, and 6-pentamethylpiperidine, 4-(meta) acryloylamino - 1, 2, 2, 6, and 6-pentamethylpiperidine, 4-cyano-4-(meta) acryloylamino - 2, 2, 6, and 6-tetramethylpiperidine etc. is mentioned.

[0087] As a concrete chemical name of the above-mentioned ultraviolet-rays stability monomer (2), it is 1-(meta) acryloyl-4-(meta) acryloylamino, for example. - They are 2, 2, 6, and 6-tetramethylpiperidine and 1-(meta) acryloyl-4-cyano-4-(meta) acryloylamino. - They are 2, 2, 6, and 6-tetramethylpiperidine and 1-KUROTO noil-4-KUROTO yloxy. - 2, 2, 6, and 6-tetramethylpiperidine etc. is mentioned.

[0088] It is desirable for the compound same with having mentioned above as a monomer expressed with the above-mentioned general formula (2) etc. to be mentioned, and to use cyclohexyl (meta) acrylate, methylcyclohexyl (meta) acrylate, cyclo dodecyl (meta) acrylate, and tert-butyl cyclohexyl (meta) acrylate also in these.

[0089] When the monomer component which forms an ultraviolet absorption nature acrylic polymer is made into 100 mass %, for example as amount of the above-mentioned ultraviolet-rays stability monomer (1) and the above-mentioned ultraviolet-rays stability monomer (2) used, it is desirable that it is 0.1 - 99 mass %. There is a possibility that the operation which controls degradation of the resin considered to be based on the radical generated by ultraviolet rays as it is under 0.1 mass %, and improves the weatherability of an ultraviolet absorption layer cannot fully be demonstrated. Since the content rate of the ultraviolet absorption nature monomer in the monomer component which forms an ultraviolet absorption nature acrylic polymer becomes less enough when 99 mass % is exceeded, there is a possibility that the ultraviolet absorption ability of an ultraviolet absorption layer may become less enough. More preferably, it is 0.5 to 50 mass %, and is one to 10 mass % still more preferably.

[0090] When the monomer component which forms an ultraviolet absorption nature acrylic polymer is made into 100 mass %, for example as amount of the monomer used expressed with the above-mentioned general formula (2), it is desirable that it is 1 - 99 mass %. Since the content rate of the ultraviolet absorption nature monomer in the monomer component which forms an ultraviolet absorption nature acrylic polymer becomes less enough when there is a possibility that compatibility with other resin and the cross linking agent which form an ultraviolet absorption layer as it is under 1 mass % may worsen and 99 mass % is exceeded, there is a possibility that the ultraviolet absorption ability of an ultraviolet absorption layer may become less enough. More preferably, it is five to 80 mass %, and is ten to 50 mass % still more preferably.

[0091] the monomer which has other copolymerizable unsaturated bonds in addition to the ultraviolet absorption nature monomer which mentioned above the monomer component which forms the above-mentioned ultraviolet absorption nature acrylic polymer, an ultraviolet-rays stability monomer, and a monomer -- one sort -- or two or more sorts may also be included. It is not limited especially as a monomer which has such an unsaturated bond, for example, an acrylic acid (meta), the methyl (meta) acrylate mentioned above, a copolymerizable partial saturation monomer, etc. are used suitably.

[0092] It is not limited especially as weight average molecular weight (Mw) of the above-mentioned

ultraviolet absorption nature acrylic polymer, for example, it is desirable that it is 2000-500000. More preferably, it is 4000-300000 and is 5000-200000 still more preferably.

[0093] the resin constituent containing the ultraviolet absorption nature acrylic polymer which forms the above-mentioned ultraviolet absorption layer -- the need -- responding -- polymers other than an ultraviolet absorption nature acrylic polymer -- one sort -- or two or more sorts may also be included. The heat cross-linking polymer which it is not limited especially as polymers other than such an ultraviolet absorption nature acrylic polymer, for example, carries out [ silicone resin / thermoplastic polymer; urethane resin, such as polyvinyl chloride resin, polyester resin, acrylic resin, and silicone resin, aminoplast resin, ] independent bridge formation; the heat cross-linking polymer which constructs a bridge by cross linking agents, such as polyester resin and acrylic resin, is mentioned. In addition, when it is not limited especially as a content in the resin constituent of an ultraviolet absorption nature acrylic polymer, for example, a resin constituent is made into 100 mass %, it is desirable that it is 20 to 100 mass %. More preferably, it is 40 to 100 mass %, and is 60 to 100 mass % still more preferably. moreover, a solvent, an additive, etc. which mentioned the resin constituent above further -- one sort -- or two or more sorts may also be included.

[0094] Not having been limited especially when it was the polymer which it has an average of two or more per the compound which has the cross-linking functional group which exists in a resin constituent, and two or more functional groups per molecule which carry out a bridge formation hardening reaction as the above-mentioned cross linking agent, or molecule, but could use one sort or two sorts or more according to the class of cross-linking functional group which exists in a resin constituent, having chosen them suitably, for example, having mentioned above, this appearance, etc. are mentioned. Also in these, it is desirable that they are the poly isocyanate compound and/or an epoxy resin in combination with the radical which has active hydrogen. Moreover, it is more desirable to come to form an ultraviolet absorption nature acrylic polymer, when the cross-linking functional group and cross linking agent which have a cross-linking functional group and the above-mentioned ultraviolet absorption nature acrylic polymer has [ an ultraviolet absorption layer ] construct a bridge. By this, the physical properties and weatherability of an ultraviolet absorption layer will improve more, and ultraviolet absorption ability will be maintained over a long period of time.

[0095] Although the resin constituent containing the ultraviolet absorption nature acrylic polymer which forms the above-mentioned ultraviolet absorption layer can be prepared by mixing the compound mentioned above It is not limited especially as an approach of forming an ultraviolet absorption layer on a transparence plastic film base material with such a resin constituent. For example, the resin constituent containing (1) ultraviolet-absorption nature acrylic polymer is applied on a transparence substrate. The resin constituent containing the approach;(2) ultraviolet-absorption nature acrylic polymer which is made to harden the resin constituent applied after that, and forms an ultraviolet absorption layer is fabricated and film-ized. By sticking on a transparence plastic film base material, the approach of making it into a layered product etc. is mentioned, and it is desirable from the approach of (1) being simple. Moreover, separately, as a line, production of a layered product and bridge formation of a resin constituent are good, and may be performed to coincidence.

[0096] It is not limited especially as thickness of the above-mentioned ultraviolet absorption layer, and is not limited that what is necessary is just to especially set up suitably by a use application etc. For example, it is desirable to make the thickness at the time of desiccation set to 0.5-100 micrometers. It is 1-50 micrometers more preferably.

[0097] As for the near infrared ray absorptivity layered product of this invention, it is desirable to make transparency high, for example, it is desirable to make a haze (haze value) into 3.0% or less. More preferably, it is 2.0% or less and is 1.0% or less still more preferably. Such a near infrared ray absorptivity layered product can be used suitable for the object for the apertures of cars, such as an object for the apertures of a building or a residence, an electric car, and an automobile, an arcade, a greenhouse, etc., and also it can be used for the object for infrared remote control incorrect actuation prevention in a plasma display, the object for protection of a solar panel, sunglasses, common glasses, safety goggles, a contact lens, etc.

[0098]

[Example] Although an example is given to below and this invention is further explained to a detail, this invention is not limited only to these examples. In addition, especially, as long as there is no notice, the "section" shall mean the "weight section" and "mass %" shall be meant "%."

[0099] Toluene 84g was added to the 500ml flask equipped with synthetic example 1 agitator, dropping opening, the thermometer, the cooling pipe, and the nitrogen gas inlet, and it heated at 105 degrees C. It is 2 and 2-azobis to this as 69g [ of cyclohexyl methacrylate ], 16.5g [ of 2-ethylhexyl acrylate ], 0.5g [ of methacrylic acids ], and methacrylic-acid 2-hydroxyethyl 14g, and an initiator. - (2-methyl butyronitrile) Continuation dropping was carried out over 3 hours, and 2g was heated for further 2 hours. Then, toluene 18g was added and 50% solution of acrylic resin was obtained. In addition, the number average molecular weight of the polymer which constitutes this acrylic resin was 5800. The presentation of the monomer component used for composition of acrylic resin and the acquired characteristic value of acrylic resin are shown in Table 1.

[0100] Acrylic resin was obtained by the same approach as the synthetic example 1 except the presentation of the monomer component used for composition of synthetic example 2 acrylic resin having been shown in Table 1. The characteristic value of the obtained acrylic resin is shown in Table 1.

[0101] Toluene 84g was added to the 500ml flask equipped with synthetic example 3 agitator, dropping opening, the thermometer, the cooling pipe, and the nitrogen gas inlet, and it heated at 115 degrees C. To this, as 81g of cyclohexyl methacrylate, 18.5g of 2-ethylhexyl acrylate, 0.5g of methacrylic acids, and an initiator, carried out continuation dropping, having applied 1g of t-butylperoxy-2-ethylhexanoate for 3 hours, it was made to heat for further 2 hours, toluene 18g was added after that, and 50% solution of acrylic resin was obtained. In addition, the number average molecular weight of the polymer which constitutes this acrylic resin was 17000. The presentation of the monomer component used for composition of acrylic resin and the acquired characteristic value of acrylic resin are shown in Table 1.

[0102] In the 500ml flask equipped with synthetic example 4 agitator, dropping opening, the thermometer, the cooling pipe, and the nitrogen gas inlet, methyl-ethyl-ketone 100g, 2 - [2'-hydroxy-5'-(methacryloyloxy-ethyl) phenyl] -2H-benzotriazol 18g, 34g [ of cyclohexyl methacrylate ] and styrene 3g, 3g of 2-ethylhexyl methacrylate, 2g of butyl acrylates, and 0.2g (2 and 2'-azobis - (2-methyl butyronitrile)) of initiators were taught, and it heated to reflux temperature, introducing and stirring nitrogen gas. They are methyl ethyl ketones 80g and 2 to this. - [2'-hydroxy-5'-(methacryloyloxy-ethyl) phenyl] -2H-benzotriazol 18g, 34g [ of cyclohexyl methacrylate ], and styrene 3g, 3g of 2-ethylhexyl methacrylate, 2g of butyl acrylates, and the mixture of 0.2g of initiators were dropped over 2 hours, it heated for further 2 hours, and 50% solution of acrylic resin was obtained. In addition, the number average molecular weight of the polymer which constitutes this acrylic resin was 20000.

[0103] By the same monomer presentation as the example 1 of synthetic example 5 composition, and the reaction condition, it changed to toluene as a solvent, and reacted using the dipropylene glycol mono-ether, and 50% solution of acrylic resin was obtained. The number average molecular weight of the polymer which constitutes this acrylic resin was 6300. The presentation of the monomer component used for composition of acrylic resin and the acquired characteristic value of acrylic resin are shown in Table 1.

[0104] Dipropylene-glycol-monomethyl-ether 100g was added to the 500ml flask equipped with synthetic example 6 agitator, dropping opening, the thermometer, the cooling pipe, and the nitrogen gas inlet, and it heated at 80 degrees C. It is 2 and 2-azobis as an acrylic silane monomer to this as the Shin-Etsu Chemical Co., Ltd. make, KBM503 (trade name) 40g, 50g of methyl methacrylates, 10g of butyl acrylates, and an initiator. - (2-methyl butyronitrile) Carry out continuation dropping over 2 hours, and 0.8g was made to heat for further 4 hours, after that, dipropylene-glycol-monomethyl-ether 135g was added, and 30% solution of acrylic silicone resin was obtained. The number average molecular weight of the polymer which constitutes this acrylic resin was 40000. The presentation of the monomer component used for composition of acrylic resin and the acquired characteristic value of acrylic resin are shown in Table 1.

[0105]

[Table 1]

		合成例1	合成例2	合成例3	合成例5	合成例6
単 量 体 成 分 の 組 成 ( 部 )	1)CHMA	69	47	81	69	—
	2)2-EHA	16.5	38.5	18.5	16.5	—
	3)MAA	0.5	0.5	0.5	0.5	—
	4)HEMA	14	14	—	14	—
	5)KBM503	—	—	—	—	40
	6)MMA	—	—	—	—	50
	7)BA	—	—	—	—	10
	8)開始剤1	2	2	—	2	0.8
	9)開始剤2	—	—	1	—	—
溶剤		溶剤1	溶剤1	溶剤1	溶剤2	溶剤2
樹脂 溶液	不揮発分	50	49.9	50	50	30
	数平均分子量	5800	5500	17000	6300	40000

[0106] Table 1 is explained below. CHMA is cyclohexyl methacrylate. 1) 22-EHA It is 2-ethylhexyl acrylate. 3MAA It is a methacrylic acid and 4HEMA is methacrylic-acid 2-hydroxyethyl. 5KBM503 The acrylic silane monomer (being the Shin-Etsu Chemical Co., Ltd. make and a trade name "KBM503" 6) MMA 7BA is butyl acrylate, it is a methyl methacrylate and nine initiators 2 are [ eight initiators 1 are 2 and 2'-azobis - (2-methyl butyronitrile), and ] t-butylperoxy2-ethylhexanoate. In a solvent, a solvent 1 is toluene and a solvent 2 is dipropylene glycol monomethyl ether.

[0107] The moisture vapor transmission of the base material used in the example and the example of a comparison was measured by the following approaches.

Measurement of the moisture vapor transmission of a base material (Measuring condition)

JIS Based on Z0208, it measured on condition that 40 degrees C and 90%RH, and asked for the moisture vapor transmission of a base material. The result was shown in Table 2.

[0108]

[Table 2]

基材の種類	厚さ	透湿度[g/m <sup>2</sup> /24h]
PETフィルム	50 $\mu$ m	14
ポリカーボネート	0.5mm	3

[0109] The Sumitomo Bayer urethane company make and the Sumi Joule N3200(trade name) 1 section were mixed as the 0.23 sections, the toluene 4.3 section, and a curing agent, and coating of the acrylic resin 10 section of the example 1 of example 1 composition and the coloring matter 1 was carried out to the PET film (the Toray Industries, Inc. make, a trade name "lumiler T60", 50 micrometers), they were dried at 80 degrees C, and the near infrared ray absorptivity coloring matter content layer of 5 micrometers of thickness was formed. On this near infrared ray absorptivity coloring matter content layer, it laminated through between the rolls heated by 70 degrees C in piles in the PET film, and the near infrared ray absorptivity layered product was produced. The 0.3 sections were mixed, and coating of the resin 10 section of the synthetic example 4, the methyl-ethyl-ketone 3 section, and Sumi Joule N3200 was carried out on the PET film layer, they were dried at 80 degrees C, and the ultraviolet absorption layer of 5 micrometers of thickness was formed. The accelerated weathering test was carried out for the sample film produced by the above approach after storage for seven days at 50 degrees C. Moreover, the haze (haze value) of a test sample was measured.

[0110] With the configuration of a raw material shown in examples 2-5 and example 7 table 3,

production of a test sample and a weathering test were carried out by the same approach as an example 1. namely, the acrylic resin using the acrylic resin obtained by binder resin in the synthetic example 2 in the example 2 obtained by binder resin in the synthetic example 3 in the example 3 -- using -- an example 4 -- near infrared ray absorption coloring matter -- coloring matter 2 -- 0.16 \*\*\*\*\* and an example 5 -- near infrared ray absorption coloring matter -- coloring matter 3 -- \*\*\*\* for the 0.13 sections -- things -- except produced the test sample by the same approach as an example 1, and carried out the accelerated weathering test. Moreover, in the example 7, except having not prepared an ultraviolet absorption layer, the test sample was produced by the same approach as an example 1, and the accelerated weathering test was carried out. Moreover, the haze (haze value) of a sample sample was measured.

[0111] The Sumitomo Bayer urethane company make and the Sumi Joule N3200(trade name) 1 section were mixed as the 0.23 sections, the propylene-glycol-monomethyl-ether 4.3 section, and a curing agent, and coating of the acrylic resin 10 section of the example 5 of example 6 composition and the coloring matter 1 was carried out to the polycarbonate (the Asahi Glass Co., Ltd. make, a trade name "Lexan 9034", 0.5mm thickness), they were dried at 120 degrees C, and the near infrared ray absorptivity coloring matter content layer of 5 micrometers of thickness was formed. On this near infrared ray absorptivity coloring matter content layer, between the rolls heated by 80 degrees C in piles in the above-mentioned polycarbonate was passed, and the near infrared ray absorptivity layered product was produced. On the polycarbonate of this layered product, the resin of the synthetic example 4 was used and the ultraviolet absorption layer was formed on the same conditions as an example 1. The accelerated weathering test was carried out for the test sample produced by the above approach after storage for seven days at 50 degrees C. Moreover, the haze (haze value) of a test sample was measured.

[0112] the 0.5 section (OFM) of ORUTOGI acid TORIMECHIRU are added as a dehydrating agent to the acrylic resin 10 section of the example 1 of example 8 composition -- except having used it one day after, the test sample was produced by the same approach as an example 1, and the promotion weatherability trial was carried out. Moreover, the haze (haze value) of a sample sample was measured.

[0113] The near infrared ray absorption coloring matter content layer was formed on the PET film like example 9 example 1. The 0.3 sections were blended, and coating of the resin 10 section of the synthetic example 4, the methyl-ethyl-ketone 3 section, and Sumi Joule N3200 (trade name) was carried out to another PET film, they were dried at 80 degrees C, and the ultraviolet absorption layer of 5 micrometers of thickness was formed. Urethane system adhesives lock bond J It is the curing agent lock bond J to the ten sections about RU-40. The one section (all are the Rock Paint Co., Ltd. make and a trade name) and ethyl acetate were dried for it at 60 degrees C, after it blended H-5 [ 9-section ] and it carried out coating to the field contrary to the ultraviolet absorption layer of a PET film, and the adhesives layer of 5 micrometers of thickness was formed. Between the rolls which heated the near infrared ray absorption coloring matter content layer and adhesives layer of the film of these two sheets at 50 degrees C in all was passed, and the laminated film was produced. The promotion weatherability trial was carried out for the sample produced by the above approach after storage for seven days at 50 degrees C. Moreover, the haze (haze value) of a sample sample was measured.

[0114] The 0.23 sections were mixed, coating of the resin 20 section of the example 6 of example 10 composition and the coloring matter 1 was carried out to the PET film like the example 1, and the near infrared ray absorptivity coloring matter content layer was formed. Furthermore, formation of a lamination and an ultraviolet absorption layer was performed by the same approach as an example 1, and the test sample was produced. The accelerated weathering test was carried out using this test sample. Moreover, the haze (haze value) of a test sample was measured.

[0115] The Asahi Glass Co., Ltd. make, the Lumiflon 200 (trade name) 10 section, and coloring matter 1 were mixed as example 11 resin, above-mentioned Sumi Joule N3200 (trade name) was mixed as the 0.27 sections, the toluene 7 section, and a curing agent, coating was carried out to the PET film like the example 1, and the near infrared ray absorptivity coloring matter content layer was formed.

Furthermore, formation of a lamination and an ultraviolet absorption layer was performed by the same approach as an example 1, and the test sample was produced. The accelerated weathering test was



carried out using this test sample. Moreover, the haze (haze value) of a test sample was measured.

[0116] As example 12 resin, the 0.27 sections and the toluene 14.5 section were mixed, coating of the Toyobo Co., Ltd. make, the Byron 200(trade name) 6 section, and the coloring matter 1 was carried out to the PET film like the example 1, and the near infrared ray absorptivity coloring matter content layer was formed. Furthermore, formation of a lamination and an ultraviolet absorption layer was performed by the same approach as an example 1, and the test sample was produced. The accelerated weathering test was carried out using this test sample. Moreover, the haze (haze value) of a test sample was measured.

[0117] As example 13 resin, the 20 sections were mixed for Japanese polyurethane company make and NIPPORAN 5124 (trade name), the 0.23 sections were mixed for coloring matter 1, coating was carried out to the PET film like the example 1, and the near infrared ray absorptivity coloring matter content layer was formed. Furthermore, formation of a lamination and an ultraviolet absorption layer was performed by the same approach as an example 1, and the test sample was produced. The accelerated weathering test was carried out using this test sample. Moreover, the haze (haze value) of a test sample was measured.

[0118] The Sumitomo Bayer urethane company make and the Sumi Joule N3200(trade name) 1 section were mixed as the 0.23 sections, the toluene 4.3 section, and a curing agent, and coating of the acrylic resin 10 section of the example 1 of example of comparison 1 composition and the coloring matter 1 was carried out to the PET film (the Toray Industries, Inc. make, a trade name "lumiler T60", 50 micrometers), they were dried at 80 degrees C, and the near infrared ray absorptivity coloring matter content layer of about 5 micrometers of thickness was formed. The 0.3 sections were mixed, and coating of the resin 10 section of the synthetic example 4, the methyl-ethyl-ketone 3 section, and Sumi Joule N3200 was carried out on the near infrared ray absorptivity coloring matter content layer, they were dried at 80 degrees C, and the ultraviolet absorption layer of about 5 micrometers of thickness was formed. The accelerated weathering test was carried out for the sample film produced by the above approach like the example 1 after storage for seven days at 50 degrees C.

[0119] The Sumitomo Bayer urethane company make and the Sumi Joule N3200(trade name) 1 section were mixed as the 0.23 sections, the propylene-glycol-monomethyl-ether 4.3 section, and a curing agent, and coating of the acrylic resin 10 section of the example 5 of example of comparison 2 composition and the coloring matter 1 was carried out to the polycarbonate (the Asahi Glass Co., Ltd. make, a trade name "Lexan 9034", 0.5mm thickness), they were dried at 120 degrees C, and the near infrared ray absorptivity coloring matter content layer of 5 micrometers of thickness was formed. On the polycarbonate of this layered product, the resin of the synthetic example 4 was used and the ultraviolet absorption layer was formed on the same conditions as an example 1. The accelerated weathering test was carried out for the test sample produced by the above approach after storage for seven days at 50 degrees C. Moreover, the haze (haze value) of a test sample was measured.

[0120] Production of a test sample and an accelerated weathering test were carried out by the same approach as the example 1 of a comparison except having not prepared an ultraviolet absorption layer with the configuration of a raw material shown in example of comparison 3 table 3.

[0121] The configuration of the near infrared ray absorptivity layered product which produced the configuration of the near infrared ray absorptivity layered product produced in the examples 1-13 to drawing 1 in the examples 1-3 of a comparison to drawing 2 is shown, respectively. In drawing 1, (1) is the cross-section conceptual diagram of the near infrared ray absorptivity layered product produced in examples 1-6, an example 8, and the examples 10-13, (2) is the cross-section conceptual diagram of the near infrared ray absorptivity layered product produced in the example 7, and (3) is the cross-section conceptual diagram of the near infrared ray absorptivity layered product produced in the example 9. Moreover, in drawing 2, (1) is the cross-section conceptual diagram of the near infrared ray absorptivity layered product produced in the examples 1-2 of a comparison, and (2) is the cross-section conceptual diagram of the near infrared ray absorptivity layered product produced in the example 3 of a comparison. Thus, in the near infrared ray absorptivity layered product of an example, the structure whose near infrared ray absorptivity coloring matter content layer is all pinched with a transparency



plastic film base material by the near infrared ray absorptivity layered product of the example of a comparison to considering as the structure inserted with a transparence plastic film base material is not taken.

[0122]

[Table 3]

			実施例													比較例		
			1	2	3	4	5	6	7	8	9	10	11	12	13	1	2	3
近赤外線吸収層を形成する樹脂組成物(部)	バインダー樹脂	合成例1	10	—	—	10	10	—	10	10	10	—	—	—	—	10	—	10
		合成例2	—	10	—	—	—	—	—	—	—	—	—	—	—	—	—	—
		合成例3	—	—	10	—	—	—	—	—	—	—	—	—	—	—	—	—
		合成例5	—	—	—	—	—	10	—	—	—	—	—	—	—	—	10	—
		合成例6	—	—	—	—	—	—	—	—	—	20	—	—	—	—	—	—
		ルミフロン200	—	—	—	—	—	—	—	—	—	—	10	—	—	—	—	—
		バイロン200	—	—	—	—	—	—	—	—	—	—	—	6	—	—	—	—
		ニッポラン5124	—	—	—	—	—	—	—	—	—	—	—	—	20	—	—	—
	色素	色素1	0.23	0.23	0.23	—	—	0.23	0.23	0.23	0.23	0.23	0.27	0.27	0.23	0.23	0.23	0.23
		色素2	—	—	—	0.16	—	—	—	—	—	—	—	—	—	—	—	—
		色素3	—	—	—	—	0.13	—	—	—	—	—	—	—	—	—	—	—
	脱水剤	OFM	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—
	硬化剤	硬化剤1	1	1	—	1	1	1	1	1	1	—	1	—	—	1	1	1
紫外線吸収層を形成する樹脂組成物(部)	バインダー樹脂	合成例4	10	10	10	10	10	10	—	10	10	10	10	10	10	10	10	—
	硬化剤	硬化剤1	0.3	0.3	0.3	0.3	0.3	0.3	—	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	—
基材			PET	PET	PET	PET	PET	PC	PET	PET	PET	PET	PET	PET	PET	PET	PC	PET

[0123] Table 3 is explained below. In binder resin, it is a fluoro resin by Asahi Glass Co., Ltd., and it is polyester resin by Toyobo Co., Ltd., and is [ Lumiflon / 200 (trade name) / Byron / 200 (trade name) ] urethane resin by the Japanese polyurethane company in NIPPORAN 5124 (trade name). Moreover, coloring matter 1 is VOPc (2, 5-Cl<sub>2</sub> PhO)<sub>8</sub> (CH<sub>3</sub>). 4 It is {Ph(CH<sub>3</sub>) CHNH}<sub>3</sub> F. Coloring matter 2 VOPc (2, 5-Cl<sub>2</sub> PhO)<sub>8</sub> {2 and 6-(CH<sub>3</sub>)<sub>2</sub> PhO}<sub>4</sub> 4 (PhCH<sub>2</sub> NH) it is -- coloring matter 3 -- CuPc (2, 5-Cl<sub>2</sub> PhO)<sub>8</sub> {2 and 6-(CH<sub>3</sub>)<sub>2</sub> PhO}<sub>4</sub> 4 (PhCH<sub>2</sub> NH) it is . In a curing agent 1, he is Sumi Joule N3200 (a trade name, the Sumitomo Bayer urethane company make).

[0124] Weatherability of the evaluation approach coloring matter (accelerated weathering test)

The permeability of the light in the absorption maximum wavelength of the test sample produced by the approach of examples 1-13 and the examples 1-3 of a comparison was measured with the spectrophotometer (Ti initial value). Moreover, the permeability in the wavelength concerned of a base material film was measured (T<sub>0</sub>). Using this test sample, the irradiation test in ultraviolet-rays auto fade meter (the Suga Test Instruments Co., Ltd. make, trade name "FAL-AU-B") was performed for 192 hours, and the permeability in the absorption maximum wavelength after a trial was measured (T). From such measured value, near infrared ray absorbing-power survival rate R (%) was calculated by the degree type. The result was shown in Table 4.

$$R(\%) = (T_0 - T) / (T_0 - T_i)$$

[0125]

[Table 4]

	実施例													比較例		
	1	2	3	4	5	6	7	8	9	10	11	12	13	1	2	3
近赤外線吸収能残存率 (%)	89	81	80	90	98	89	77	93	90	86	92	82	76	68	69	50

[0126] About measurement of the haze of the test sample produced by the approach of the measurement examples 1-13 of the haze (haze value) of a layered product, it is JIS. According to K7105, it carried out using the hazemeter by Nippon Denshoku Co., Ltd. The result was shown table 5.

[0127]

[Table 5]

	実施例												
	1	2	3	4	5	6	7	8	9	10	11	12	13
ヘーズ(%)	0.8	0.8	0.8	0.8	0.8	1.1	0.8	0.8	1.0	0.9	0.8	0.9	1.0

[0128] Thus, in the example, since the structure which degradation of the near infrared ray absorbing power of coloring matter sandwiches with a transparence plastic film base material in the example of a comparison to having little good weatherability since it is considering as the configuration whose near infrared ray absorptivity coloring matter content layer is pinched with a transparence plastic film base material is not taken, degradation of coloring matter is large and a result inferior to weatherability has been brought.

[0129]

[Effect of the Invention] Since the near infrared ray absorptivity layered product of this invention consists of an above-mentioned configuration, the weatherability which it was controlled that near infrared ray absorptivity coloring matter deteriorates, and was excellent can be demonstrated. Can use suitable for the object for the apertures of cars, such as an object for the apertures of a building or a residence, an electric car, and an automobile, an arcade, a greenhouse, etc., and also It can use suitable for the object for infrared remote control incorrect actuation prevention in a plasma display, the object for protection of a solar panel, sunglasses, common glasses, safety goggles, a contact lens, etc.

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[Translation done.]